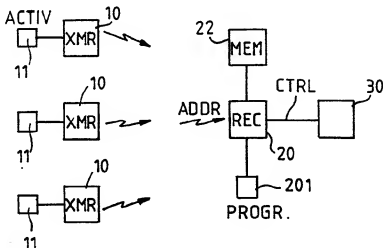




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : G08C 19/28	A1	(11) International Publication Number: WO 92/15977 (43) International Publication Date: 17 September 1992 (17.09.92)
<p>(21) International Application Number: PCT/BE91/00016</p> <p>(22) International Filing Date: 4 March 1991 (04.03.91)</p> <p>(71) Applicant (for all designated States except US): SYDEC N.V. [BE/BE]; Hoogkamerstraat 42, B-9100 Sint-Niklaas (BE).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): MATTHYS, Chris [BE/BE]; Fortsebaan 30, B-2930 Brasschaat (BE).</p> <p>(74) Agent: VANDERPERRE, Robert; Bureau Vander Haeghen, Rue Colonel Bourg 108A, B-1040 Brussels (BE).</p> <p>(81) Designated States: AT (European patent), AU, BE (European patent), BR, CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LU (European patent), NL (European patent), NO, SE (European patent), SU, US.</p>		<p>Published <i>With international search report.</i></p>

(54) Title: SELECTIVELY ADDRESSABLE PROGRAMMABLE REMOTE CONTROL SYSTEM



(57) Abstract

A method of programming a to-be-controlled device for enabling same to be selectively addressable by a signal transmitted from at least one remote transmitter, said method comprising the steps of providing a receiver having no own address assigned to it, and operatively connecting it to the to-be-controlled device, providing at least one remote transmitter adapted to transmit a signal containing a predetermined individual address in response to an activating signal, enabling said receiver in programming mode for allowing it to store the individual address contained in the signal transmitted from each activated remote transmitter, and activating any one of said at least one remote transmitter, whereby the individual address of said at least one remote transmitter is stored in the receiver such that said receiver is capable to selectively control said device only upon recognizing an incoming transmitter address being identical to any one of the addresses stored therein.

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**SELECTIVELY ADDRESSABLE PROGRAMMABLE
REMOTE CONTROL SYSTEM**

Field of the invention

5 The present invention relates to a programmable remote control system for the actuation of a device and it is more particularly concerned with a method of programming the addressing connections between a remote control and the to-be-controlled device.

10 Exemplary typical applications of such a system include the switching on/off or dimming up/down of a light, the wireless connection between a sensor in an alarm system and the alarm central unit, the opening/closing of a lock (e.g. a suitcase lock) etc. by means of a remote transmitter.

15

Background of the invention

20 Today, consumer products are appearing on the market, whereby a communication link between modules is essential. In most cases an emitter will broadcast information, using a particular technology and a particular medium. A receiver then has to receive the signal, interpret it, "decide" whether the information
25 was intended for him or not, and take appropriate action. Somehow a system needs to be implemented whereby information can be passed selectively between an emitter and a receiver : "selective addressing".

In many industrial "high-end" products, often related to computer environments (networks), this issue has already been addressed in different ways, using several algorithms, technologies and media. Such applications usually rely on a well controlled environment and well trained staff to run and/or maintain the system.

More and more electronics are making their appearance in "low-end" products, to be used in less controlled environments, by less skilled people. The computer techniques are not always suited for these applications.

In an environment where each transmitter potentially can reach a number of many receivers and each receiver can potentially be reached by a number of transmitters, many links should be able to co-exist without interfering with each other. In such an environment it is mandatory to take away the freedom of a user to decide upon any address, because the address information of co-existing transmitters is not known to him. Therefore he cannot decide whether a particular address is unique in its environment.

25

Summary of the invention

In accordance with a first aspect of this invention there is provided a method of programming a to-be-controlled device for enabling same to be selectively addressable by a signal transmitted from at least one remote transmitter, said method comprising the steps of providing a receiver having no own address assigned to it, and operatively connecting it to the to-be-controlled device, providing at least one remote

transmitter adapted to transmit a signal containing a predetermined individual address in response to an activating signal, enabling said receiver in programming mode for allowing it to store the individual address contained in the signal transmitted from each activated remote transmitter, and activating any one of said at least one remote transmitter, whereby the individual address of said at least one remote transmitter is stored in the receiver such that said receiver is capable to selectively control said device only upon recognizing an incoming transmitter address being identical to any one of the addresses stored therein.

According to a second aspect of the invention there is provided a programmable remote control system for the actuation of a device, said system comprising at least one remote transmitter arranged for transmitting a signal containing a predetermined address information, in response to an activating signal, at least one remote-controlled programmable receiver operatively connected to the to-be-controlled device for the actuation of same, said receiver being adapted to be enabled in a programming mode to store the address information transmitted from at least one remote transmitter and being further adapted to receive and check any signal transmitted from a remote transmitter and to produce a control signal for actuating the to-be-controlled device only when the received signal contains an address information matching any one of the stored address information.

In a particular embodiment, the receiver includes a memory arranged for storing the address information of said at least one remote transmitter, means for plac-

ing the receiver in a programming mode operation, thereby to allow transmitter address information to be stored in the memory, and means for checking said received address information from a remote transmitter
5 against the address information stored in the memory, and for producing a control signal for actuating the to-be-controlled device when a transmitted address information from a remote transmitter corresponds to a particular stored address information.

10

It is to be understood that the signal transmitted from the remote transmitters may further contain any suitable actuation command data for actuating a to-be-controlled device.

15

The programmable system according to the invention has considerable advantages.

It is very user-friendly, simple and highly flexible.
20 It is very easy to program, de-program or re-program a link between any given transmitter with any given receiver, even for technically unqualified people (e.g. depressing a program button on the receiver, operating a lightswitch on the transmitter, and de-
25 pressing the program button on the receiver again).

The system is very reliable. It does not leave any opportunity for a user to decide upon an address, which may already be present in his environment (e.g.
30 lightswitch in a neighbour apartment), highly reducing the probability for address interferences.

It eliminates the need for any physically to-be-manipulated address-defining component. It does not
35 require a user to modify/touch any part of the elec-

tronics, protecting a user from the module and vice versa.

5 The system is consistent, error-free and transparent to a user. No user needs to know or install any address at any time (not even while programming a link), totally eliminating the possibility for a user to implement a wrong or inconsistent address.

10 The system supports all kind of links : one-to-one, one-to-many, many-to-one and many-to-many. It can support absolute and incremental programming, by simply entering the programming mode differently (e.g. by holding the programming button for a longer time) :
15 either initialise a receiver (clean it from all previously recorded addresses) before recording a new address; or record an extra address in a receiver on top of already recorded addresses.

20

Brief Description of the Drawings

Fig. 1 schematically represents an exemplary embodiment of the system according to the invention.

25

Fig. 2 is a flow chart illustrating the programming mode operation of the selectively addressable receiver according to the invention.

30

Fig. 3 is a flow chart illustrating the operation of a selectively addressable receiver according to the invention when in selective addressing mode.

Description of an exemplary embodiment

The invention is for use in an environment comprising several co-existing remote transmitters and receivers. For illustrative purposes, Fig. 1 schematically shows three remote transmitters 10 and one receiver 20 which is operatively connected to a to-be-controlled device 30. Every transmitter is adapted for transmission of a predetermined individual address that, in principle, has not to be modified by a user or preferably cannot even be modified by a user. Each transmitter is adapted to broadcast a signal containing the predetermined address information when it is activated by an activating signal ACTIV produced by an activating means 11, e.g. an activating button.

The receivers have no own physical address. Each receiver comprises a memory 22 (preferably a non-volatile memory) for storing one or several address information from individual remote transmitter(s) with which an addressing connection should be allowable. Each receiver has two modes of operation. In the first or selective addressing mode, the receiver is listening and responds to any address information ADDR matching an address that has been previously recorded. In the second or programming mode, each receiver temporarily operates to record the transmitter address information data transmitted from an activated remote transmitter and to store same in its memory, thereby keeping a record of any transmitter with which a selective addressing connection has been defined. The programming mode is entered by the user actuating a program switch 21 (push-button or the like) on the receiver.

The operation of the programming system of the invention will be described hereinafter with reference to the flow charts of Figs. 2 and 3.

5 Fig. 2 illustrates the operation in programming mode. Said mode is effective to cause the receiver to store any transmitter address signal it should remember for respond to. The programming mode is entered in box 101. In box 102 a decision needs to be made as to
10 whether the memory should be cleared or not prior to entering a new address information. If the memory should be cleared, in box 103 the user actuates an erase command on the receiver in order to erase all stored addresses from the memory. Then a remote trans-
15 mitter is activated in box 104 and the transmitted address information ADDR is entered and stored in the memory in box 105.

Should additional transmitter addresses be stored in the receiver memory, the user successively activates the required remote transmitters in box 106, whereby the respective address information are entered and stored in the receiver memory. When no further address has to be entered, the user selects to exit the pro-
20 gramming mode in box 107, thereby to place the receiver in the selective addressing mode again. When in selective addressing mode, the "programmed" receiver is ready for use.

30 Operating the receiver simply requires a user to activate a remote transmitter in box 201 (Fig. 3), e.g. by turning a ON/OFF light switch ON or OFF. The receiver 20 that receives the transmitted signal operates in box 202 to check said transmitted address information
35 against every address information stored in its memory

and when the transmitted address information is recognized to correspond to any one of the addresses that have been previously stored, the receiver operates to produce a control signal CNTRL for actuating the to-be-controlled device 30, thereby to cause the required action to be performed in box 203, e.g. to switch the light ON.

Possibly, the required action can be defined and commanded by data contained in the transmitted signal along with the address information. When the transmitted address information does not match a stored address information then the receiver just ignores said signal.

15

For the receiver 20 to be capable of operating as outlined hereinbefore, there is provided at least the following commands :

- 20 1) an erase command for erasing addresses from the memory;
 2) a program command for entering the programming mode operation.

25 It should be recognized that the erase command can be implemented by providing a separate erase switch (e.g. a push-button) or e.g. by combining it with the program command as a double-function switch. One function would be effective when holding down the switch for a short time for instance and the second function would be effective when holding down the switch for a longer period of time.

35 In order to provide additional security at programming time, various techniques can be implemented. For

instance, the transmitter can be adapted to operate in a programming mode (e.g. by holding the transmitter activating button for a longer period of time) in order to avoid that an accidental operation of a remote transmitter would be interpreted as a to-be-recorded address, or the receiver can be arranged for multiple transmission before accepting a to-be-recorded address. Also, the receiver could indicate his status through auditive feedback, e.g. single long beep for programming mode with erasure of the memory, double long beep for programming mode with erasure of the memory, single short beep for entering a new address in the memory, etc.

Although there has been described hereinbefore one particular embodiment in accordance with the invention for the purpose of illustrating the manner in which the invention may be used to advantage, it will be appreciated that the invention is not limited thereto. Accordingly, any and all modifications, variations or equivalent arrangements which may occur to those skilled in the art should be considered to be within the scope of the invention as defined in the appended claims.

CLAIMS

1. A method of programming a to-be-controlled device for enabling same to be selectively addressable by a signal transmitted from at least one remote transmitter, said method comprising the steps of :
- 5 providing a receiver (20) and operatively connecting it to the to-be-controlled device, said receiver having no own address assigned to it,
- providing at least one remote transmitter (10) adapted to transmit a signal containing a predetermined individual address in response to an activating signal,
- 10 enabling said receiver (20) in programming mode for allowing it to store the individual address contained in the signal transmitted from each activated remote transmitter (10), and activating any one of said at least one remote transmitter,
- 15 whereby the individual address of said at least one remote transmitter is stored in the receiver (20) such that said receiver is capable to selectively control said device only upon recognizing an incoming transmitter address being identical to any one of the addresses stored therein.
2. A selectively addressable programmable remote control system for the actuation of a device, said system comprising :
- 25 at least one remote transmitter (10) arranged for transmitting a signal when activated, said signal containing a predetermined individual address information (ADDR),
- 30 at least one remote-controlled programmable receiver (20) operatively connected to the to-be-controlled device (30) for the actuation of same,

said receiver being adapted to be enabled in a programming mode to store the address information transmitted from at least one remote transmitter and being further adapted to receive and check any signal transmitted from a remote transmitter and to produce a control signal for actuating said to-be-controlled device only when the received signal contains an address information matching any one of the stored address information.

3. A system according to claim 2, wherein said receiver (20) includes :

a memory (22) arranged for storing the address information of said at least one remote transmitter;

means for placing the receiver (20) in a programming mode operation, thereby to allow transmitted address information from a remote transmitter (10) to be stored in the memory (22); and

means for checking said received address information from a remote transmitter against the address information stored in said memory, and for producing a control signal for actuating said to-be-controlled device when a transmitted address information from a remote transmitter corresponds to a particular stored address information.

4. A system according to claim 3, wherein the signal transmitted from said at least one remote transmitter further contains actuation command data.

5. A system according to claim 2, wherein the receiver is adapted to accept a transmitted address information only after a number of signal occurrences.

6. A system according to claim 4, wherein the receiver

is adapted to accept a transmitted address information only after a number of signal occurrences.

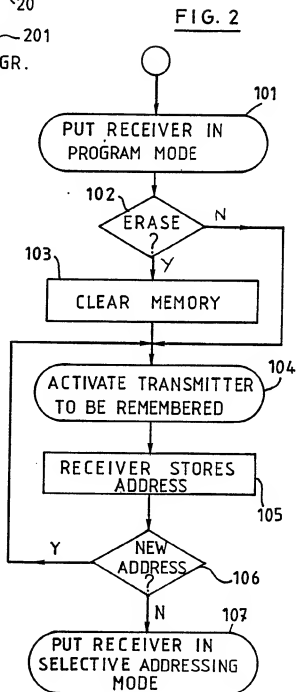
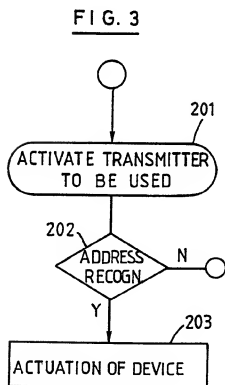
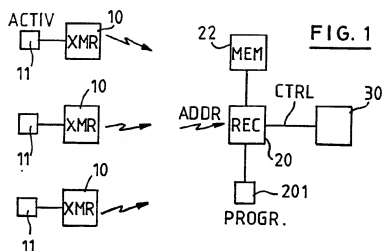
5 7. A system according to claim 2, wherein the transmitter is adapted to operate in a programming mode.

8. A system according to claim 4, wherein the transmitter is adapted to operate in a programming mode.

10 9. A system according to claim 5, wherein the transmitter is adapted to operate in a programming mode.

15 10. A selectively addressable programmable remote-controlled receiver for the actuation of a device, said receiver being adapted to be enabled in a programming mode to store the address information transmitted from at least one remote transmitter and being further adapted to receive and check any signal transmitted from a remote transmitter and to produce a control signal for actuating said to-be-controlled device only when the received signal contains an address information matching any one of the stored address information.

20 11. A receiver according to claim 10, wherein the receiver is adapted to accept a transmitted address information only after a number of signal occurrences.



INTERNATIONAL SEARCH REPORT

International Application No.

PCT/BE 91/00016

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁴		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 G08C19/28		
II. FIELDS SEARCHED		
Minimum Documentation Searches ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	G08C	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	FR,A,2 644 918 (DURANTON) 28 September 1990	1-4,7,8, 10
Y	see the whole document ---	5,6,9,11
X	US,A,4 912 463 (LI) 27 March 1990 see claims ---	1-4,7,8, 10
X	WO,A,9 006 024 (GUTH) 31 May 1990 see abstract; claims ---	1-4,7,8, 10
Y	US,A,4 870 419 (BALDWIN ET AL.) 26 September 1989 see claims 1,2,5 ---	5,6,9,11
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
05 NOVEMBER 1991	19. 11. 91	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	REEKMANS M.V.	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. BE 9100016
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A-2644918	28-09-90	None	
US-A-4912463	27-03-90	None	
WO-A-9006024	31-05-90	None	
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